WHAT IS CLAIMED IS:

1. A process for producing a semiconductor member making use of a thin-film crystal semiconductor layer, the process comprising the steps of:

(1) anodizing the surface of a first substrate to form a porous layer at least on one side of the substrate;

(2) forming a semiconductor layer at least on the surface of the porous layer;

(3) removing the semiconductor layer at its peripheral region;

(4) bonding a second substrate to the surface of the semiconductor layer;

(5) separating the semiconductor layer from the first substrate at the part of the porous layer by applying an external force to at least one of the first substrate, the porous layer and the second substrate; and

(6) treating the surface of the first substrate after separation and repeating the above steps (1) to (5).

2. The process for producing a semiconductor member according to claim 1, wherein, in the step (3), the semiconductor layer at its peripheral region is removed together with the porous layer lying directly beneath that region.

3. A process for producing a semiconductor member making use of a thin-film crystal semiconductor layer, the process comprising the steps of:

(1) anodizing the surface of a first substrate to form a porous layer at least on one side of the substrate;

(2) forming a semiconductor layer at least on the surface of the porous layer;

(3) bonding a second substrate to the semiconductor layer;

(4) removing the semiconductor layer at its region not covered with the second substrate;

(5) separating the semiconductor layer from the first substrate at the part of the porous layer by applying an external force to at least one of the first substrate, the porous layer and the second substrate; and

(6) treating the surface of the first substrate after separation and repeating the above steps (1) to (5).

4. The process for producing a semiconductor member according to claim 3, wherein, in the step (4), the semiconductor layer at its region not covered with the second substrate is removed together with the porous layer lying directly beneath that region.

5. The process for producing a semiconductor member according to claim 1 or 3, wherein the first substrate comprises silicon.

6. The process for producing a semiconductor member according to claim 1 or 3, wherein the first substrate comprises a single crystal.

7. The process for producing a semiconductor member according to claim 1 or 3, wherein, in the step (2), a semiconductor junction is formed in the semiconductor layer.

8. A process for producing a solar cell making use of a thin-film crystal semiconductor layer, the process comprising the steps of:

(1) anodizing the surface of a first substrate to form a porous layer at least on one side of the substrate;

(2) forming a semiconductor layer at least on the surface of the porous layer;

(3) removing the semiconductor layer at its peripheral region;

(4) bonding a second substrate to the surface of the semiconductor layer;

(5) separating the semiconductor layer from the first substrate at the part of the porous layer by

applying an external force to at least one of the first substrate, the porous layer and the second substrate; and

(6) treating the surface of the first substrate after separation and repeating the above steps (1) to (5).

9. The process for producing a solar cell according to claim 8, wherein, in the step (3), the semiconductor layer at its peripheral region is removed together with the porous layer lying directly beneath that region.

10. A process for producing a solar cell making use of a thin-film crystal semiconductor layer, the process comprising the steps of:

(1) anodizing the surface of a first substrate to form a porous layer at least on one side of the substrate;

(2) forming a semiconductor layer at least on the surface of the porous layer;

(3) bonding a second substrate to the semiconductor layer;

(4) removing the semiconductor layer at its region not covered with the second substrate;

(5) separating the semiconductor layer from the first substrate at the part of the porous layer by

applying an external force to at least one of the first substrate, the porous layer and the second substrate; and

(6) treating the surface of the first substrate after separation and repeating the above steps (1) to (5).

11. The process for producing a solar cell according to claim 10, wherein, in the step (4), the semiconductor layer at its region not covered with the second substrate is removed together with the porous layer lying directly beneath that region.

12. The process for producing a solar cell according to claim 8 or 10, wherein the first substrate comprises silicon.

13. The process for producing a solar cell according to claim 8 or 10, wherein the first substrate comprises a single crystal.

14. The process for producing a solar cell according to claim 8 or 10, wherein, in the step (2), a semiconductor junction is formed in the semiconductor layer.

15. A process for producing a semiconductor

member obtained by separating a thin-film crystal semiconductor layer formed on a first substrate to transfer the former to a second substrate, wherein the thin-film crystal semiconductor layer is removed by etching by electropolishing at its part on the periphery of the first substrate.

16. The process for producing a semiconductor member according to claim 15, wherein a separating layer lies between the first substrate and the thin-film crystal semiconductor layer, and only the thin-film crystal semiconductor layer, only the separating layer or both the thin-film crystal semiconductor layer and the separating layer is/are removed at its/their part on the periphery of the first substrate.

17. The process for producing a semiconductor member according to claim 16, wherein the separating layer comprises a porous layer.

18. The process for producing a semiconductor member according to claim 16, wherein the separating layer comprises two or more porous layers.

19. The process for producing a semiconductor member according to claim 16, wherein the separating

layer is formed by ion implantation.

20. A process for producing a semiconductor member making use of a thin-film crystal semiconductor layer, the process comprising the steps of:

(1) anodizing the surface of a first substrate at least on its principal-surface side to form a porous layer;

(2) forming a semiconductor layer on the surface of the porous layer;

(3) removing the semiconductor layer at its part on the periphery of the first substrate by electropolishing;

(4) bonding a second substrate to the surface of the semiconductor layer;

(5) separating the semiconductor layer from the first substrate at the part of the porous layer to transfer the semiconductor layer to the second substrate; and

(6) treating the surface of the first substrate after separation and repeating the above steps (1) to (5).

21. The process for producing a semiconductor member according to claim 20, wherein, in the step (3), the semiconductor layer at its peripheral portion is removed together with the porous layer lying directly

beneath that portion.

22. The process for producing a semiconductor member according to claim 20, wherein the first substrate comprises silicon.

23. The process for producing a semiconductor member according to claim 20, wherein the first substrate comprises a single crystal.

24. The process for producing a semiconductor member according to claim 20, wherein, in the step (2), a semiconductor junction is formed in the semiconductor layer.

25. The process for producing a semiconductor member according to claim 20, which further comprises, between the steps (5) and (6), the step of forming a semiconductor junction on the surface of the semiconductor layer having been transferred to the second substrate.

26. The process for producing a semiconductor member according to claim 20, wherein the second substrate comprises a flexible film, and force that acts in the direction where the film is separated from the first substrate is applied to the film to separate

the semiconductor layer at the part of the porous layer.

27. The process for producing a semiconductor member according to claim 26, wherein the second film comprises a resinous film.

28. A process for producing a solar cell obtained by separating a thin-film crystal semiconductor layer formed on a first substrate to transfer the former to a second substrate, wherein the thin-film crystal semiconductor layer is removed by etching by electropolishing at its part on the periphery of the first substrate.

29. The process for producing a solar cell according to claim 28, wherein a separating layer lies between the first substrate and the thin-film crystal semiconductor layer.

30. The process for producing a solar cell according to claim 29, wherein the separating layer comprises a porous layer.

31. The process for producing a solar cell according to claim 29, wherein the separating layer comprises two or more porous layers.

32. The process for producing a solar cell according to claim 29, wherein the separating layer is formed by ion implantation.

33. A process for producing a solar cell making use of a thin-film crystal semiconductor layer, the process comprising the steps of:

(1) anodizing the surface of a first substrate at least on its principal-surface side to form a porous layer;

(2) forming a semiconductor layer on the surface of the porous layer;

(3) removing the semiconductor layer and the porous layer at their part on the periphery of the first substrate by electropolishing;

(4) forming a surface anti-reflection layer on the surface of the semiconductor layer at its part other than that on the periphery of the first substrate;

(5) bonding a second substrate to the surface of the semiconductor layer;

(6) separating the semiconductor layer from the first substrate at the part of the porous layer to transfer the semiconductor layer to the second substrate; and

(7) treating the surface of the first substrate after separation and repeating the above steps (1) to (6).

34. The process for producing a solar cell according to claim 33, wherein, in the step (3), the semiconductor layer at its peripheral portion is removed together with the porous layer lying directly beneath that portion.

35. The process for producing a solar cell according to claim 33, wherein the first substrate comprises silicon.

36. The process for producing a solar cell according to claim 33, wherein the first substrate comprises a single crystal.

37. The process for producing a solar cell according to claim 33, wherein the step of removing the semiconductor layer and porous layer at their part on the periphery of the first substrate and the step of forming a surface anti-reflection layer on the surface of the semiconductor layer at its part other than that on the periphery of the first substrate are carried out simultaneously.

38. The process for producing a solar cell according to claim 33, wherein the step of removing the semiconductor layer and porous layer at their part on the periphery of the first substrate and the step of

forming a surface anti-reflection layer on the surface of the semiconductor layer at its part other than that on the periphery of the first substrate are carried in the same anodizing bath.

39. The process for producing a solar cell according to claim 33, wherein, in the step (2), a semiconductor junction is formed in the semiconductor layer.

40. The process for producing a solar cell according to claim 33, which further comprises, between the steps (6) and (7), the step of forming a semiconductor junction on the surface of the semiconductor layer having been transferred to the second substrate.

41. The process for producing a solar cell according to claim 33, wherein the second substrate comprises a flexible film, and force that acts in the direction where the film is separated from the first substrate is applied to the film to separate the semiconductor layer at the part of the porous layer.

42. The process for producing a solar cell according to claim 41, wherein the second film comprises a resinous film.

43. An anodizing apparatus comprising, at the peripheral portion of a substrate to be subjected to anodizing, a first electrode coming in contact with the back side of the substrate and a second electrode facing the first electrode, interposing the substrate between them; the first electrode having substantially the same form as the second electrode.

44. The anodizing apparatus according to claim 43, wherein the first and second electrodes each have the form of a beltlike ring or a beltlike polygon.

45. The anodizing apparatus according to claim 43, wherein the second electrode comprises platinum.

46. An anodizing apparatus comprising, at the peripheral portion of a substrate to be subjected to anodizing, a first electrode coming in contact with the back side of the substrate and a second electrode facing the first electrode, interposing the substrate between them, and, in the remaining substrate region excluding the peripheral portion, a third electrode coming in contact with the back side of the substrate and a fourth electrode facing the third electrode, interposing the substrate between them; the first electrode and third electrode having substantially the same form as the second electrode and fourth electrode,

respectively.

47. The anodizing apparatus according to claim 46, wherein the first and second electrodes each have the form of a beltlike ring or a beltlike polygon.

48. The anodizing apparatus according to claim 46, wherein the third and fourth electrodes each have the form of a disk or a polygon.

49. The anodizing apparatus according to claim 46, wherein the distance between the first and second electrodes is shorter than the distance between the third and fourth electrodes.

50. The process for producing a semiconductor member according to claim 15, wherein the thin-film crystal semiconductor layer is separated in a desired form by electropolishing etching.

51. The process for producing a solar cell according to claim 28, wherein the thin-film crystal semiconductor layer is separated in a desired form by electropolishing etching.